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ENTOMOLOGICAL NEWS

FEBRUARY, 1939

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ENTOMOLOGICAL NEWS

VOL. L. FEBRUARY, 1939 No. 2

When is a Name a Subspecific Name?

The Editor, ENTOMOLOGICAL NEWS:

Sir,

I have read with some interest and considerable dismay an article by William Hovanitz on "The Interpretation of the term subspecies, etc., etc.," which appeared in your February, 1938, issue. This article is of value in calling attention to the anomalous position in which entomological names of a category lower than subspecies now find themselves, inasmuch as they are not covered by the International Rules of Nomenclature. Lepidopterists are concerned more than other entomologists with names of this kind, and, writing as one of them, I agree with Mr. Hovanitz that the practice of lepidopterists is not as consistent as it should be, and undoubtedly calls for action; I cannot, however, believe that the action he appears to envisage will do anything to remedy this state of affairs.

The authors of the Rules cannot have been unaware of these other categories of names; they do not deny their existence, they merely ignore it (Article 2). To deduce from the premises set forth by Mr. Hovanitz that "it follows that the subspecies *is* the only category of lower rank than the species" is surely quite unwarranted; he is confusing taxonomy with nomenclature. One may, however, deduce from these same premises certain other things, namely (1) that the correct way of writing a subspecific name is the trinomial, and conversely that (in the absence of information to the contrary) any trinomial must be assumed to have reference to a subspecies; (2) that the rules do not apply to other categories of names and that in our treatment of these names, therefore, we are not governed by the Rules; (3) that these names in categories lower than the subspecies, having no status in scientific nomenclature, cannot take precedence over names recognized as valid

under the rules.

One may illustrate these points by making use of Mr. Hovanitz's own examples.

1. *Eurymus alexandra edwardsi* form *hatui* B. & B. is not quadrinomial (on Mr. Hovanitz's own reasoning such a thing could not exist, there being only uni-, bi- and tri-nomials in nomenclature), it is a valid trinomial to which is added a name that the authors, by calling it a form-name, have carefully excluded from the operation of the rules; *hatui* may not be a scientific name controlled by the rules, but one cannot deny that it is a name.

2. *Euphydras editha.* Neither "ab. *fieldi*" nor "r. *wrighti*" has any status in nomenclature, not being set forth as a trinomial or as a subspecific name by its author. Neither is a valid subspecific name until published as a trinomial, and whichever is published first in that form is the name of the subspecies, provided that no valid subspecific name has been published in the interval.

3. *interligata* Cabeau. As Mr. Hovanitz has been unable to refer to the original descriptions of the names which he discusses in this paragraph, I quote below the exact form in which each name was published:

(Rev. Men. Soc. Ent. Namuroise, 1919 : 49)

1. *Argynnis selene* Schiffermiller ab. *interligata,* n. ab.
2. *Argynnis euphrosyne* Linné ab. *interligata,* n. ab.
3. *Argynnis lathonia* Linné ab. *interligata,* n. ab.

(loc. cit., 1922 : 18)

4. *Argynnis dia* Linné ab. *interligata* n. ab.

(loc. cit., 1922 : 46)

5. *Argynnis pales* Schiffermiller forme *arsilache* Esper ab. *interligata,* n. ab.
6. *Argynnis ino* Rottemburg ab. *interligata,* n. ab.

If I understand Mr. Hovanitz correctly, he would have us believe that all these names (except No. 5 presumably) are trinomials. But a trinomial is written, thus: *Alpha beta gamma,* not *Alpha beta* ab. *gamma;* and the author here has obviously

taken considerable pains to make it clear that he is describing aberrations, and therefore, presumably, not subspecies. Mr. Hovanitz, however, in spite of this would appear to suggest that, whatever the author intended to do, he had in fact described, willy nilly, six homonymous subspecies* in the genus *Argynnis;* which, as Euclid used to say, is absurd.

4. Although the statement of fact given in this paragraph does not contain the whole truth, as the author himself suggests, that is immaterial to the argument. There are several species known to me of which the first name valid under the code was based upon a specimen which proved subsequently to be very atypical of the species, or, in other words an aberration. Does this present any difficulty? Take the (hypothetical) case quoted by Mr. Hovanitz. Is there any objection to referring to the aberration of *Argynnis niobe* as *A. niobe* ab. *adippe? Niobe* and *adippe* at the time of publication were equally valid *names, whatever their taxonomic values* may have been.

5. Precisely the same misunderstanding of the Rules leads Mr. Hovanitz again to an untenable position in this paragraph; but there is at least a clue to the nature of his misunderstanding. He uses the phrase *"Erebia ligea* ab. *subcaeca* Schultz; a trinomial." That seems to crystallise the difficulty. I maintain, and I believe that ninety nine lepidopterists out of a hundred would agree with me, that that is not a trinomial. A subspecific name is a trinomial name; does it follow that every use of three terms in conjunction must, whatever form it takes, be a subspecific name, even though its author explains that it is not?

Nomenclature is a sufficiently vexed and vexing a subject as it is, without the dragging of such red herrings as this across its tortuous path. Let Mr. Hovanitz apply to the Commission for a definition of a "trinomial" if he thinks it worth while: we would prefer to give our time to more productive labours.

Yours very truly,

N. D. RILEY.

* Since the Code lays it down (Art. II) that specific and subspecific names are co-ordinate, the third term in a trinomial must not occur more than once in any one genus.

An Annotated List of The Butterflies of Nebraska (Lepid.: Rhopalocera).

By R. A. LEUSSLER, Omaha, Nebraska.

(Continued from Vol. xlix, page 280.)

134. H. COMMA (L.) race COLORADO (Scud.). Flies on the higher plains of the western part of the state with the preceding species and is equally common. Specimens are rather bright yellow fulvous and match up with the low altitude found in Colorado.

135. H. PAHASKA Leussler. Sioux County near Harrison, Nebraska; see Ent. News xlix, p. 5, 1938.

136. H. ATTALUS (Edw.). Rare. 1 female, Omaha, June 21, 1913; 2 females, 1 male, Omaha, June 17, 1922.

137. H. OTTOE (Edw.). The typical form is found only occasionally, and as *ogallala*, a darker, more heavily marked form is the prevalent one in the eastern as well as in the western part of the state, it is my opinion that the latter is the normal form of the first brood of this species, and that *ottoe* was described from an abnormally light specimen. The fact that intergrades of every degree are found strengthens this belief. Typical specimens from Pilger (2 ♂), Omaha (1 ♂ 1 ♀,) Hackberry Lake, Cherry County (1 ♂).

H. OTTOE form OGALLALA (Leussler). As stated above, this is the normal form of the early brood. It is found only in native prairie in late June and early July. Has been taken at Omaha, Lincoln, West Point, Pilger, Hackberry Lake and Wauneta, near the Colorado line.

H. OTTOE form PAWNEE (Dodge). This, the late brood, makes its appearance about August 25. The type locality is about 35 miles northwest of Fremont, and not far from there I have found it abundant upon a number of occasions. It is partial to the flowers of blazing star (Liatris).

138. HYLEPHILA PHYLAEUS (Dru.). Rare. Taken only in some years. Omaha, Papilion, Blair, and reported from Dodge County by Dodge. Frequents wild asters and the blossoms of alfalfa.

139. POLITES VERNA (Edw.). Very rare. 1 specimen taken at Omaha, July 3, another July 5, 1912; 1 at Plattsmouth, June 26, 1930.

140. P. MANTAAQUA (Scud.). I have found this only in two pieces of native prairie land near Omaha and never in large numbers. Some specimens appear intermediate between

typical *manataaqua* and the western race *rhena* (Edw.).

P. MANATAAQUA race RHENA (Edw.). Not uncommon in Sioux County in June and July.

141. P. THEMISTOCLES (Latr.). Our commonest skipper. Found over the entire state. Most numerous in June and again in August.

142. P. MYSTIC race DACOTAH (Edw.). Common in Sow Belly Canyon, Sioux County in June 1911. In June, 1918, F. H. Shoemaker collected a long series at Bazile Mills, some of which were dark, heavily marked specimens like typical *mystic* from eastern st..tes, but most of them were race *dacotah*.

143. P. CORAS (Cram.). A very common skipper of general distribution throughout the state; flies with *themistocles*, the seasons being about the same.

144. ATALOPEDES CAMPESTRIS (Bdv.). Very common, at least as far west as Valentine; June to October. The late fall brood is much darker on under surface than the earlier broods.

145. CATIA OTHO (A and S.) race EGEREMET (Scud.). Rather local but found regularly at Omaha the latter part of July; partial to flowers of bergamot.

146. ATRYTONE LOGAN (Edw.). Rather rare. Specimens from Omaha, Lincoln, West Point, Meadow and Plattsmouth, all taken in June and July.

A. LOGAN race LAGUS (Edw.). Not uncommon in Sioux County in July, and has also been taken in Cherry County. This race has the ground color paler and the black borders much narrower.

147. A. AROGOS (Bdv. and Lec.). Formerly quite common, now found only where original prairie remains. Single brooded; flies from about June 20 through July. Omaha, West Point, McCook and Oconto.

148. A. VESTRIS (Bdv.). Found over the entire state, being common in the western part. Apparently double brooded for it has been taken in every month from June to September.

149. A. BIMACULA (G. and R.). Very local; I have taken specimens in only two moist meadows at Omaha and in another similar meadow at Valley, early part of July. At the latter locality a female without spots was taken, *contradicta* Leussler.

150. A. DION (Edw.). Not uncommon but very local, being found only in marshy places where wild rice and marsh grasses grow. Late June to middle of July. Omaha, Waterloo and Valley.

151. A. PONTIAC (Edw.). Frequents the same localities as

the preceding species and flies in company with it. It makes its appearance perhaps a week later but its season is overlapped by that of *dion*. Nebraska specimens are very much larger than those from eastern states.

152. POANES VIATOR (Edw.). Another marsh species, but more rare in the state than either *dion* or *pontiac*. July. Omaha, Valley and Hackberry Lake.

153. P. HOBMOK (Harr.). Common; single brooded; appears about Memorial Day and flies throughout June. Omaha, Lincoln, West Point, Neeley, Valentine, Cedar Bluffs and Harrison. Although I have collected hundreds of specimens I have never found the dark female Pocahontas (Scud.). in the state.

154. P. TAXILES (Edw.). Common in the canyons of Sioux County. Appears last week in June and remains through most of July. Fond of the flowers of bergamot.

155. ATRYTONOPSIS HIANNA (Scud.). Common in the sand hills of Cherry County where it appears to be particularly attracted to the yellow puccoon flowers which abound there. Has been taken in Sioux County also and at West Point. It is subject to much variation in the number and size of spots, both above and beneath. Flies from the end of May well into June.

156. AMBLISCIRTES VIALIS (Edw.). Fairly common in the eastern part of the state especially where patches of vetch are found, the flowers of which prove attractive to it. Double brooded, about the first of May and about the middle of July.

157. A. OSLARI (Skin.). Common in the western part of the state. Usually found in wet, gravelly spots. Double brooded, first appearing between 10th and 20th of June, and the second about the middle of August. Specimens from Valentine, Bloomington and Harrison.

158. LERODEA EUFALA (Edw.). Found in the eastern part of the state, where it is sometimes quite abundant in September and October on a great variety of flowers, both wild and cultivated.

159. MEGATHYMUS STRECKERI (Skin.). Inhabits the sand hill regions where the yucca plant flourishes. Single brooded so far as known, appearing early in June. It is extremely variable with regard to size, wing shape, width of border on secondaries, size and shape of spots, depth of color of the yellow spots and border, and number of spots on under side of secondaries. It is this race which Dr. Holland figures in the revised Butterfly Book, Pl. LXXII, and to which he has given

the name *leussleri.*

SPECIES INCLUDED IN PREVIOUS LISTS BUT OMITTED FROM THE PRESENT ONE.

THECLA POEAS (Hub.) (*Strymon cecrops* Fabr.). Albert Cassell lists it as being found at Nebraska City and Barber from Nemaha County, on the authority of W. E. Taylor. Both are in the same general locality, and as *cecrops* is a well marked species, not easily confounded with any of the other hairstreaks, it seems fairly certain that it occasionally occurs in Nebraska.

LYCAENA FILENUS (Poey). Mentioned in Cassell's list as quite numerous at Nebraska City. *Filenus* is a synonym of *hanno* (Stoll), a species not likely to occur in Nebraska. It seems probable that *isola* (Reak,) is the species referred to.

The following are all included in Barber's list. Quotations are from the list; comments are the writer's. For the generic names in Barber's list it has been thought best to substitute those used in Barnes and Benjamin's check list.

ARGYNNIS ATLANTIS (Edw.). "West Point, Northern Nebraska. Not very common." I have seen no specimens from Nebraska.

EUPHYDRYAS PHAETON (Dru.). "Lancaster County (Mr. McMillan). Mr. Scudder in his map showing the distribution of this species indicates its presence in the extreme eastern portion of the state along the Missouri river." I know of no reason why it should not occur here but have seen no specimens taken in the state.

MELITAEA MINUTA (Edw.). "Sioux County." Probably *pola* (Bdv.), which is the species found in Sioux County.

POLYGONIA FAUNUS (Edw.). "Nemaha County (W. E. Taylor) Found occasionally." I fear this was a misidentification on Taylor's part.

BASILARCHIA ARTHEMIS (Dru.). "Nemaha County (W. E. Taylor) Rare." J. D. Gunder in an article on Basilarchia (Can. Ent. Feb. 1934) mentions *arthemis* and *proserpina* from Lincoln, Nebr. As neither Dr. Wolcott, Dr. Dawson, nor the many collectors among students of Nebraska University, had ever taken true *arthemis* in the state, I wrote to Gunder for particulars of the record. He replied that he had obtained the specimens through Lloyd Martin, of Roscoe, Calif. Mr. Martin in turn wrote me that he had obtained them from Geo. W. Baker of Lincoln, Nebr., and Mr. Baker, a young collector, informed me that whatever material he sent Mr. Martin has been collected locally but that he did not recall taking any white-banded *Basilarchia,* and thought he surely would have noticed

it if he had. Under the circumstances, I fear, the record must be classed as doubtful.

INCISALIA IRUS (Godt.). "Not taken by us in the state. Strecker says 'it occupies the same territory as *niphon* and *titus;*' and these two are found in the state, though uncommon." It is possible that this species occurs here but I have not seen any specimens taken in the state.

I. NIPHON (Hbn.). "Nemaha County (W. E. Taylor). Rare." Not impossible, but no Nebraska specimens found.

LYCAENA EPIXANTHE (Bdv. and Lec.). "Not taken by us in the state. Scudder says 'I find a memorandum of its occurence in Iowa and Nebraska', and Edwards credits it to Kansas." I can add nothing to the above.

PLEBEJUS SCUDDERII (Edw.). "Sioux County." In the collection of the University of Nebraska I found specimens labeled *scudderii,* from Sioux County, but the female proved to be *shasta* race *minnehaha* (Sud.) and the male *melissa* (Edw.).

ASCIA NAPI (L.) OLERACEA (Harr.). "Lancaster and Nemaha Counties (W. E. Taylor)." It is possible that in the early days this species did occur in Nebraska.

PAPILIO OREGONIA Edw. "Sioux County." Probably *brucei* Edw.

P. ZOLIACON Bdv. "Sioux County." This, too, probably refers to *brucei* Edw.

OARISMA POWESHEIK (Parker). "Not taken by us in the state. Scudder writes 'It flies in Iowa, Nebraska and Dakota according to Parker and Dodge'." Although I have not found it in Nebraska, I have found it in abundance at Lake Okoboji in northwestern Iowa, and therefore think it likely it may extend over the line into Nebraska.

POANES MASSASOIT (Scud.). "Dodge County (Dodge) Nebraska. (Prof. French Butt. East U. S.)" I have every reason to believe that this species has been taken in the state, although it has not been my good fortune to encounter it.

P. ZABULON (Bdv. and Lec.). "Dodge County (Dodge). Fort Niobrara (W. L. Carpenter) Lincoln, Nebraske City, West Point." I surmise that all of the above records refer to *hobomok.* An examination of the West Point and Lincoln specimens in the collection of the University of Nebraska tend to bear this out.

HESPERIA SASSACUS Harr. "Not taken by us in the state. Nebraska is mentioned by Prof. French in Butt. East U. S." I very much doubt that the true *sassacus* occurs in the state.

It is more likely to be *dacotae* (Skin.). which was described from Volga, S. D., and which I have taken sparingly at Lake Okoboji, Iowa.

H. LEONARDUS Harr. "Dodge and Nemaha Counties (W. E. Taylor)." I am inclined to think the above records rest upon a misidentification. Dark specimens of true *pawnee* somewhat resembles *leonardus* on the upper surface and may have been mistaken for the latter species.

OCHLODES SYLVANOIDES (Bdv.). "Not taken by us in the state. Mr. Edwards mentions this species for Nebraska in his list (Trans. Amer. Ent. Soc. XI? 1884, 311)." It is probable that Edwards had in mind the race he named *napa,* which I have taken in the Black Hills of South Dakota, and which it is conceivable may come into Nebraska.

P. OCOLA (Edw.). "New Halena, Custer County." Clearly a misidentification. A specimen labeled *Pamphila ocola* from New Halena, Custer County, was located in the collection of the University of Nebraska and proved to be a female *Atrytone bimacula.*

ATRYTONE ARPA (Bdv. and Lec.). "Not taken by us in the state. Edwards records it for the state in his list of butterflies. (Trans. Amer. Ent. Soc. VI. 1877, 54)." Most likely refers to *dion* (Edw.).

A. PALATKA (Edw.). "Nebraska. (Prof. French Butt. Of East. U. S.)" This too, most likely refers to *dion* (Edw.).

ERYNNIS ICELUS (Lint.). "Not taken by us in the state. Scudder in his map showing the distribution of this species indicates its presence over the entire state." I can add nothing to the above.

Marking the Amherst Insectary.

A founding-place of economic entomology as well as a founder were honored at Massachusetts State College, in Amherst, on September 30, when the original insectary was marked with a bronze plaque. Among those who gathered to do homage to Charles Henry Fernald, founder of the department of Entomology, was his son, Henry T. Fernald, of Winter Park, Florida. Both father and son taught entomology at Massachusetts State in the early days.

The building honored was originally 28 by 20 feet and was the headquarters for the fight against the Gypsy Moth in 1890. Charles Henry Fernald, who was the director of that fight, is an acknowledged founder of economic entomology.

Iridescence.

By Wm. T. M. Forbes, Cornell University,
Ithaca, New York.

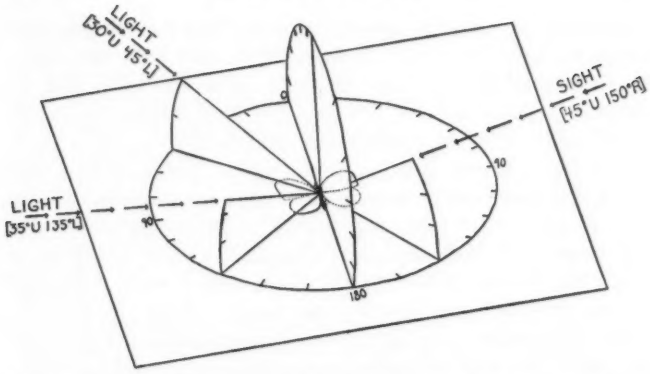
A delicate and complicated problem in describing butterflies is the specification of iridescence. It varies enormously from angle to angle, and in some cases, such as the basal spot on the fore wing of *Chlorippe*, the angle of easy vision is a limited one. Also the color seen, or even the portion of wing which may show iridescence, will change with the lighting and angle of vision.

A review of published descriptions shows a great variety of consistently ambiguous language. Most often one reads merely such statements as "wing brilliantly blue-iridescent at a suitable angle" or even vaguer ones. Perhaps once in a hundred times there is a warning to turn one's back to the window; to use diffuse (or concentrated) light, or a mention of grazing incidence.

In this paper I propose to specify, sufficiently accurately and as simply as possible, the angle of illumination and the angle of vision needed to bring out some well known cases of iridescence; and so illustrate what I hope may become a standard scheme.

Most cases of butterfly iridescence fall into one of two types. In such cases as the Morphos the light may fall from any direction (not too near grazing) and the sight is in the opposite direction and at about the same angle of elevation. In these cases the angle is not at all critical, and the direction not critical at all. I shall call such cases *Specular*. In the others the light must fall on the surface from a particular direction, and the angle of vision must be from some other fixed direction to give the maximum brilliancy. I shall call these cases *Oriented*. In most oriented cases the lines of illumination and of sight may be exchanged, and usually an inaccuracy of 15° or even somewhat more in a horizontal direction, makes very little difference.

In the case of specular iridescence it is obviously only neces-



sary to specify the vertical angle,—the same for light and for sight; but with oriented iridescence both light and sight must be specified separately, and the horizontal angle as well as the vertical. For the latter purpose I propose that we adopt the scheme of the diagram. Set the butterfly on a flat surface (black for translucent species); take the direction directly forward from the head as zero, directly to the sides as 90° (L and R), and directly behind as 180°. Then, since closer accuracy is of no advantage we may divide each right angle into sixths (15° intervals). So if the light should come about halfway from the front to the left side (considering the right pair of wings) we make the notation 45° L (see diagram). In the same way we may divide the vertical angle also into six equal parts, and for instance if the best angle is a little less than half way from horizontal to vertical (as in the diagram) we note 30° up (U). In exactly the same way we can specify the best angle from which to view the surface. For the diagram I have taken a case where the best view was somewhat to the right of, behind, and a little steeper than the angle of illumination (i. e. 45 U 150 R).

Obviously this method automatically becomes a formula. In the first case, instead of merely writing "fore wing iridescent blue" we can write "iridescence specular, 45 U," instead of some such statement as "iridescence best seen a little asym-

metrically" we can be specific with the formula: "iridescence oriented, light 30 U 45 L, sight 45 U 150 R." We have assumed that formulae are drawn up with the right side in mind, of course for the left side we must merely exchange "left" and "right" in reading our formula.

On the practical side we may suggest that a diffuse but fairly oriented light is usually best, such as a window a few feet away. It is a great convenience in judging angles to pin the insect with wing surfaces horizontal, on the middle of a flat block (white or black), and judge angles by the slope of the block rather than of the insect itself. When the block is lying horizontally on a table, a window usually gives an angle of "light" of 30 or 45 degrees,—to get a lower angle the block may be lifted toward the eye level, for a greater one it will be tilted. We also tend to hold the block nearer to ourselves than to the window, so our angle of "sight" is likely to be a unit greater than the angle of "light." This is usually best for seeing oriented iridescences. It is also convenient to remember that if the angles of "light" and "sight" are similar the butterfly is best held with our back to light; if they are nearly supplementary and not too steep we should have the light in front of us. In some cases the convenient position is with one's side to the light,—usually where the angles of sight and light are more or less at right angles, or the horizontal directions are opposite and the vertical angles moderately high. In the latter case we will be holding the butterfly tilted, with the pin-head pointing over a shoulder. Note that with low horizontal angles the head of the butterfly is toward the light (or observer), with high angles, the tail.

The following list of examples are chosen partly for variety, and partly to illustrate cases (such as *Talanga*) where present descriptions are completely ambiguous. The majority are from the Nymphalinae, famous for their varied types of iridescence.

Argynnis sagana ♀ (China). 1, oriented, light 30 U 90 L; sight 60 U 105 R. A rather faint green, especially on base of fore wing along veins and beyond the white fascia of hind wing. 2, (under side) 45 U 90 R; 60 U 105 L. Brilliant green on postmedial area of fore wing and fainter on the white markings.

3, 45 U 135 R; 60 U 75 L. The hind wing shows its iridescence at a somewhat different angle, because of the slant of its axis in the usual spreading position. The fascia shows faint pink at the same angle.

Phyciodes levina (South America). Specular 45. A not very brilliant blue.

2, oriented 45 U 90 L or R; 60 U 90 R or L. At a cross light of about this angle in either direction the blue goes greenish or brassy,—the effect is faint at other angles.

3, oriented 45 U 90 L; 90 U. A faint iridescence on the black ground. (As usual the hind wing needs a different angle, 60 L.)

Precis radama (Madagascar). Iridescence changeable. The best blue is seen at 90 U; 90 U, but so long as *viewed* from directly above the color is blue. Best violet 45 U; 30 U, viewed from opposite side from illumination; the best copper is at 20 U 90 R; 10 U 90 L.

P. artaxia (Africa). Blue base of fore wing specular, the angle not critical; the best (but very faint) violet nearly specular at 20 U; 10 U.

P. lavinia hubneri (South America). Oriented but not critical. Perhaps best green at 75 U 180; 75 U 75 L. Is good at 90 U; 90 U, but almost dead at 45 U; 30 U, where *radama* shows a very good violet. In general should be lighted at a higher angle than viewed and from the opposite side.

Salamis parrhasus (Africa) Changeable. The best green is at 30 U; 60 U, viewed from the same side as lighted, at any angle. Best brassy at 45 U; 30 U, viewed from *opposite* side; the best rose perhaps at 75 U 90 L; 90 U, and is quite critical, the irregularities of the surface destroying the effect in patches.

Callicore eluina (South America). 1, blue band specular, the angle not critical. The best copper at 75 U; 75 U, the deepest violet at grazing (perhaps 5° U).

2, the famous blue flash on hind wing is *oriented* 45 U 75 L; 60 U 60 L, and in general shows at steep angles with the light behind the observer.

3, Blue-green spot at base of fore wing same but less critical, —it still shows well at 60 U; 90 U.

C. gabaza (Columbia). 1, blue band specular and not critical, but is brassy at 75 U 60-120 R; 60 U 60-120 R.

2, oriented; 45 U 60 L; 60 U 75 L shows the best violet on the ground. It is not critical but is dead when the band is brassy.

C. asteria (Mexico). 1, oriented 30 U 0; 45 U 0. (i. e. illuminated and viewed from low angles and directly in front.) Anterior two thirds of hind wing deep purple; basal half of fore wing and inner margin of hind wing glossy blue-gray.

2, 60 U 0; 90 U. Basal half of fore wing purple, matching costal half rather than dorsal third of hind wing. Oriented but less critical.

C. neglecta (South America). 30 U 90 L; 60 U 90 R. This gives the best contrast of the two portions of the blue border of the hind wing, the band blue with gray-white edge.

2, 45 U 60 R, 60 U 120 L. Band violet, its edge green.

Perisama saussurei (South America). 1, partially oriented, 60 U; 90 U, shows best the blue patch on hind wing.

2, oriented, 45 U 90 L; 45 U 60 L shows black streaks on brown instead.

3, light blue of fore wing is semispecular, but most brilliant below cell at 45 U 135 L; 75 U 90 L, and most intensely blue perhaps at 45 U 90 L; 60 U 180.

4, the deep purple around it shows better at 45 U 135 L; 90 U.

5, at 30 U 90 L; 45 U 105 L both blues practically vanish.

6, line on hind wing specular and not critical.

Temenis laothoe (South America). This shows a good deal of local and individual variation. A very bright specimen (var. *violetta*) from the middle Napo shows:

1, oriented 45 U 0; 60 U 0. Best violet on border of hind wing.

2, oriented 60 U 180; 90 U. Best rose on disc of hind wing.

3, 60 U with any azimuth; 90 U. Deep violet on black part of fore wing (except border).

4, specular but limited, 90 U; 90 U shows blue on under side of hind wing and tip of fore wing,—becoming a rose flush at 45°.

5, to show most nearly the pure pigment buff color use oriented 15 U 180; 15 U 180.

A specimen from Peru with minimum iridescence lacks 1, 2, 3, but shows 4, 5.

Temenis pulchra (South America). Shows best purple on hind wing at a little steeper angles than *T. laothoe*,—45-60 U 0 or 180; 60-90 U 0 or 180.

(To be continued.)

The Mating and Egg-laying of Malacosoma americana (Lepid.: Lasiocampidae).

By Joseph L. Williams, University of Pennsylvania.
and Lincoln University, Pennsylvania.

Introduction.

In a preceding paper, Williams (1938), an effort was made to verify double copulation among Lepidoptera, reported by Pictet (1931) for the European *Lasiocampa quercus*. Upon finding none of the species studied copulating in this manner, the author decided to confine his researches to the American species of the family Lasiocampidae, since *Lasiocampa quercus* is not an inhabitant of this country. Except for the author's paper (1938), those of Pictet (1931) and Norris (1932) are almost the only others that deal at length with copulation among Lepidoptera.

The study of copulation among Lepidoptera was suggested to me by Professor P. P. Calvert, to whom I am indebted for many kindnesses and valuable criticisms during the preparation of this manuscript. I am also grateful to Professor H. F. Grim ot Lincoln University for many helpful suggestions and other circumstances, which made it possible to carry on this work.

Experimental Methods.

Tent caterpillars (*Malacosoma americana* Fab.) were allowed to feed on wild cherry trees near Oxford, Chester County, Pennsylvania, until they were nearly grown. They were collected early on the morning of May the twenty-first, while most of them were still in their nests. The nests were pulled apart and the caterpillars were raked into lard cans. The cans were only filled one quarter full to prevent smothering the larvae. All pupae found in the nests were placed into a different container. The larvae were then taken to the laboratory, poured into long glass dishes and freed of excrement and other foreign matter. They were then placed into large evaporating dishes and carried to their cage.

The cage was a portion of a room, the dimensions of which were 9 ft. x 4 ft. 2 ins. x 7 ft. 4 ins. (2.743 x 1.337 x 2.354

meters). It had a door through which one could enter. One inner side was covered with ordinary wire window screen. The other three sides were lined with thick pasteboard, which covered over all cracks to prevent the caterpillars from escaping.

Wild cherry foliage was placed into two two-liter flasks filled with water, and put into the cage for food. The flasks were arranged so that the foliage rested against the walls of the cage, which enabled the caterpillars to crawl upon it to feed. Newspaper was folded and placed here and there on the floor. Many larvae pupated between the folded edges of the paper, which prevented them from crowding into the corners of the cage for this purpose.

The pupae were gathered each day in the following manner. With the aid of a pair of tweezers they were removed from the newspaper and corners of the cage and placed into a large evaporating dish. They were then scattered on the bottom of a wooden box, which was covered with clean newspaper. The box had a sliding door and its top was covered with wire screen. As the moths emerged, they were removed from the wooden box and placed into large paper boxes covered with wire screen. These breeding boxes had small doors cut in one side, which could be opened and closed. When a pair of moths began to mate, they were not disturbed until the male was firmly attached to the female. They were then removed by carefully sliding a smooth piece of paper between the box and legs of the insects. The insects and paper were then placed in wide-mouth glass bottles and observed. When the mating period was over, they were distributed in the following manner and further observed.

1. Several mated pairs were placed each into a half-pint milk bottle containing a strip of absorbent paper and plugged with cotton.

2. Some mated pairs were placed each into a half-pint milk bottle without the absorbent paper.

3. Several mated pairs were placed together in a large pasteboard box, like the breeding boxes.

4. Several mated pairs were placed together in a round cage, which fitted over a gallon jug filled with water containing wild

cherry twigs. The frame of this cage was covered with mosquito netting.

5. Mated and virgin females were placed upon twigs of apple, pear, peach, plum, maple, cherry, and oak. These twigs were kept in containers filled with water.

6. Mated and virgin females were placed upon twigs of dead pear, which had been in several fires on a refuse dump for two months.

7. Virgin females were placed in a large pasteboard box, like the breeding boxes, and observed for egg-laying.

8. The egg-laying orifices of mated and virgin females, unable to lay, were probed with bristles, which were used as mechanical stimulants, to try to induce egg-laying.

9. A juice expressed from the reproductive organs of the male was injected by means of a micro-pipette into the egg-laying orifice of females unable to lay in order to try to stimulate egg-laying.

10. The reproductive organs of virgin females that made no attempt to lay, of mated and virgin females unable to lay, and of mated females that had laid were dissected from the bodies, stained, mounted as slides and studied.

Results.

The adults began to emerge on June 10, and increased in numbers each day until the maximum emerged June 18th. After the 18th, daily emergings became fewer until the last of the moths emerged, June 21st. During this period, experimental observations were conducted upon the copulatory and egg-laying habits of this moth. They began to emerge around 4:00 p. m., Eastern Summer Time, and stopped around 7:00 p. m. As soon as they emerged from the cocoons, they crawled upon the sides of the box and in this position the wings were expanded. These moths became active around 11:00 p. m. and intermittently swarned sometimes for less, and sometimes for more, than a half an hour, with rest intervals of fifteen minutes or longer. These swarming intervals continued throughout the night until around 9:00 a. m. the following morning. After 9:00 a. m. they remained quiet until late in the evening, when

swarming at intervals began again. Matings took place during the swarming periods. If couples mated a half an hour before 9:00 a. m., they remained fastened together sometimes for a half a day. The total number of moths was approximately seven thousand. Five hundred other individuals were prevented from emerging by being parasitized. The same parasite reduced the number of emerging moths the preceding year. A factor which increased the yield of moths this year was the removal of the adults from the wooden box as soon as they emerged. Last year, the adults were allowed to remain in the wooden box with the pupae, and of a thousand pupae only 74 males and 17 females emerged. Perhaps the imagos disturbed the pupae and so caused the death of the latter.

With the aid of a dissecting microscope, more than five hundred matings were observed. In every case the penis was in the bursal opening. Many pairs were plunged into ether, which instantly killed them and a dissection of these moths revealed the penis to be only in the bursal opening. If a female mated later in the day, say between 9 and 11:00 a. m., she would lay between 11:00 p. m. of the same day and 9:00 a. m. of the following day. Sometimes the insects became active before 11:00 p. m., but activity ceased by 9:00 a. m.

Females that were placed in milk bottles and the pasteboard box without twigs (nos. 1-3 above) did not lay except in a very few cases. Less than a dozen cases took place under these conditions. Virgin females that were placed in a pasteboard box (no. 7) did not lay. Mated females laid eggs on the twigs of cherry in the round cage (no. 4). They generally begin by coiling the abdomen around a twig of .3 to .5 cm. in diameter. The selected spot is a fork between the petiole of a leaf and the stem. The laying is conducted in the following manner: The head of a female is on one side of the twig and her abdomen is coiled around the twig, so that its hind end faces the head. The eggs are placed in rows at right angles to the stem and are covered with the glue-like secretion of the accessory glands. The distance from one end of the egg mass to the opposite end, due to a sidewise movement of the abdo-

men, parallel to the stem, is about 20 mm. This movement continues while eggs are being deposited for from 55 minutes to 1¾ hours. While the female is depositing her eggs, her body moves forward to make room for the next row of eggs. If the row being deposited is not exactly smooth, she smoothes it out before continuing further. When the eggs are a little more than half-way around the twig, she crawls upon the petiole still depositing her eggs until the mass has nearly surrounded the twig. To complete the laying she moves her body forward over the eggs that were laid first, the accessory gland secretion having hardened sufficiently by this time to enable her to walk upon it. When oviposition is completed, some females are unable to pull themselves away and are left hanging to the egg mass. Others fly away, but life for them is very short, for many of them die within twenty-four hours.

A similar observation was made by Le Baron (1870) on the oviposition of this moth. He says: "Three female moths (presumably mated) were enclosed in a glass vessel. They were quiet during the day but became very restless as night approached, showing that like the moths in general, they are nocturnal in their habits. On the third day a twig of apple tree was introduced into the vessel. The moths immediately ran up upon it, and put themselves in a position for laying their eggs."

Generally, a female indicating readiness to lay crawls around on the bottom and sides of the box, vibrating her wings. Many females in this condition were picked up by their wings and placed upon twigs of different trees (no. 5). No cage is necessary when this method is practised because they begin to lay at once. They laid most eggs upon wild cherry. The next choice was apple; third, peach; fourth, pear, and the last, plum.

Mated females laid freely upon the dead pear twigs taken from a refuse dump (no. 6). They did not lay, however, upon oak and maple. Virgin females were tried in the same manner (nos. 5 and 6); a few were able to deposit less than a dozen eggs, after which they remained coiled around the twigs unable to lay.

Probing the egg-laying orifice with bristle or injecting the juice expressed from the male reproductive organs into it, failed to make these females lay (nos. 8 and 9).

A study of the reproductive organs mounted on slides (no. 10) showed empty egg tubes and empty accessory gland vesicles of females that had mated and laid. Mated and virgin females unable to lay and virgin females that made no attempt to lay showed the egg tubes filled with eggs and the vesicles of the accessory glands filled with secretion after death. The female *Malacosoma americana* mates only once. This habit differs from that of *Ephestia kuehniella,* which is known to mate up to five times. The bursa of *Malacosoma americana* is not as long as that of *Ephestia kuehniella,* but the greatest tranverse diameter is longer. The length of the virgin bursa of *Malacosoma americana,* including its neck, in fixed preparations averages 1.7 mm. Its greatest transverse diameter is about 1.5 mm. The length of the virgin bursa of *Ephestia kuehniella* averages about 3.5 mm. The length of bursa of a mated *Malacosoma americana* averages about 2 mm.; its greatest transverse diameter is about 2.2 mm. The length of the bursa of *Ephestia kuehniella,* that has mated only once is about 4.2 mm. The length of its greatest transverse diameter averages about 1 mm. Every egg mass of *Malacosoma americana* found on a tree represents one oviposition and the purpose of a female life fulfilled.

(To be continued.)

Average Number of Nymphs in the Egg-masses of Tenodera sinensis, (Orthoptera: Mantidae).

The egg masses of *Tenodera sinensis* vary much in size, a large mass measures one and a third inches, by an inch and an eighth, while the smaller ones measure an inch by seven-eighths of an inch. From a large mass 289 nymphs emerged, while from a small mass 139 emerged. This gives an average of 214 nymphs to an egg mass.

PHILIP LAURENT.

Current Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, Jr.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the current or preceding year unless otherwise noted. All continued papers, with few exceptions, are recorded only at their first installment.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

Note. References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of Entomological News for 10c. The number of, or annual volume, and in some cases the part, heft, &c., the latter within ( ) follows; then the pagination follows the colon :

Papers published in the Entomological News are not listed.

GENERAL.—Cole, A. C.—Insect collecting in the Great Smoky Mts. National Park, Tenn. [J. Tenn. Acad. Sci.] 13:274-276. **Jenks, G. E.**—Marvels of metamorphosis. [Nat. Geogr. Mag.] 74:807-828, ill. **Kozhantchikov, I. V.**—On the role of metamorphosis in the zonal distribution of insects. [C. R. Acad. Sci. URSS] 20:199-201. **Lutz, F. E.**—The insect glee club at the microphone. [Natural History] 42:338-345, ll. **McClure, H. E.**—Insect aerial populations. [7] 31: 504-513, ill. **Steyskal, G.**—Notes on preparation technique. [19] 33:235. **Weber, N. A.**—The food of the giant toad, Bufo marinus, in Trinidad and British Guiana with special reference to the ants. [7] 31:499-503. **Woodward, A.**—The "Honey" of the early California Indians—a strange ethnological error. [The Masterkey] 12:175-180.

ANATOMY, PHYSIOLOGY, ETC.—Balsac, H. Heim de.—See under Coleoptera. **Carlson, J. G.**—Mitotic behavior of induced chromosomal fragments lacking spindle attachments in the neuroblasts of the grasshopper. [Proc. Nat. Acad. Sci.] 24:500-507, ill. **Cooper, R. H.**—Notes on the internal anatomy of Canthon laevis (Coleo: Scarab.). [Iowa St. Coll. J. Sci.] 12:461-466, ill. **Cumley & Haberman.**—Serological investigation of Drosophila antigens with the complement fixment reaction. [6] 46:401-415. **DiMaria, G.**—Richerche sulla vita asettica. Studio sul fabbisogno vitaminico e sell'azione svolta dai microorganismi per lo sviluppo

della Sarcophaga. [Arch. Zool. Ital.] 25:469-507, ill. **Ditman & Weiland.**—The Metabolism of the corn ear worm. II.—Glycogen and moisture. [7] 31:578-587. **Englehardt, G. P.**—An incidental observation on phototropism. [19] 33:223. **Gerould, J. H.**—Structure actions of the heart of Bombyx mori and other insects. [Acta Zoologica, Stockholm] 19:297-353, ill. **Gosswald, K.**—Ueber den einfluss von verschiedener Temperatur und Luftfeuchtigkeit auf die Lebensausserungen der Ameisen. 1.—Die Lebensdauer okologisch verschiedener Ameisenarten unter den Einfluss bestimmter Luftfeuchtigkeit und Temperatur. [94] 151:337-381, ill. **Guareschi, C.**—Ricerche sperimentali sulla ninfosi degli insetti, II. [Arch. Zool. Ital.] 25:133-197, ill. **Harries & Henderson.**—Growth of insects with reference to progression factors for successive growth stages. [7] 31:557-572. **Haskins & Enzmann.**—On a characteristic somatic modification induced by adverse environmental conditions in Drosophila. [6] 46:453-455. **Hsüeh, Mu-Lien.**—A study of the treacheation and venation of Gampsocleis gratiosa (Orth:Tettigon.). [Peking Nat. Hist. Bull.] 13:19-27, ill. **Korschelt, E.**—Einige Bemerkungen zur Frage des Muskelansatzes und der Muskelnervenverbindung. [94] 151:286-290. **Lotmar, R.**—Untersuchtungen ueber den Eisenstoffwechsel der Insekten besonders der Honigbiene. [Rev. Suisse Zool.] 45:237-271. **Ludwig & Fox.**—Growth and survival of Japanese beetle larvae reared in different media. [7] 31:445-456. **Mueller, K.**—Histologische Untersuchungen ueber der Entwicklungsbeginn bei einem Kleinschmetterling (Plodia interpunctella). [94] 151:192-242, ill. **Pflugfelder, O.**—Weitere experimentelle Untersuchungen ueber die Funktion der corpora allata von Dixippus morosus. [94] 151:149-191, ill. **Platania, E.**—Ricerche sulla struttura del tubo digerente di Reticulitermes lucifugus, con particolara riguardo all natura, origine e funzione della peritrofica. [Arch. Zool. Ital.] 25: 297-328, ill. **Rau, Phil.**—Additional observations on the sleep of insects. [7] 31:540-556, ill. **Snodgrass, R. E.**—Evolution of the Annelida, Onychophora and Arthropoda. [Smithson. Misc. Coll.] 97, no. 6:1-59, ill. The loral plates and the hypopharynx of Hemiptera. [10] 40:228-236, ill. **Stanley, T.**—The egg-producing capacity of populations of Tribolium confusum as affected by intensive cannibalistic egg-consumption. [Can. J. Res.] 16:300-306. **Stirrett, G. M.**—A field study of the flight, oviposition and establishment period in the life cycle of the European corn borer, Pyrausta nubi-

alis, and the physical factors affecting them. [Scientific Agr.] 18:355-369; 462-484; 536-557; 568-585; 656-683, ill. **Szekessy, W.**—Ein bisher unbekannter sprungapparat bei Koleopteren. [97] 58:435-440, ill. **Terio, B.**—Influenza della luce bianca e delle luci monocromatiche sullo sviluppo somatico e sulla funzionelita degli organi genitali esperienza zu Sarcophaga carnaria. [Arch. Zool. Ital.] 25:457-468, ill. **Walker, E. M.**—The cervical and thoracic exoskeleton of Grylloblatta. [Trans. R. Soc. Can.] 32(3):151. On the anatomy of Grylloblatta campodeiformis. 3.—Exoskeleton and musculature of the neck and thorax. [7] 31:588-640, ill. **Wight & Barua.**—Toxicity of mercury vapor to insects. [31] 142:754. **Williams, E. C.**—Spermatogenesis of a Mantid, Choeradodis rhombicollis. [Trans. Amer. Micros. Soc.] 57:387-394, ill.

ARACHNIDA AND MYRIOPODA.—Aragao, H. de Beaurepaire.—Nota sobre os Ixodideos da Republica Argentina. [111] 33:319-327. **Chamberlin, R. V.**—New Diplopods. [95] 51:205-208. **Fage, L.**—Quelques Arachnides provenant de fourmilieres ou de termitieres du Costa Rica. [Bull. Mus. Nat. Hist. Nat., Paris] 10:369-376, ill., (*). **Grandjean, F.**—Observations sur les Tydeidae. [Bull. Mus. Nat. Hist. Nat., Paris] (2)10:377-384, ill. **Hubbard, W. E.**—Ophiopneumicola colubri n. gen., n. sp., a lung mite from a snake. [Trans. Amer. Micros. Soc.] 57:400-406, ill. **Jenks, G. E.**—See under General. **Loomis, H. F.**—New and noteworthy Millipeds from Cuba, collected by Dr. P. J. Darlington in 1936. [Bull. M. C. Z., Harvard] 82:429-480, ill. The Cambaloid millipeds of the U. S., including a family new to the fauna and n. genn. & spp. [50] 86:27-66, ill., (k). **de Mello-Leitao, C.**—Notas sobre Alacranes Argentinos. [Not. Mus. La Plata] 3; Zool. no. 9:83-95, ill. (*). **Savory, T. H.**—Notes on the biology of harvestmen. [J. Quekett Microsc. Club] 1 (4): 89-94. **Sellnick, M.**—Eine neue Anoplocelaeno-Art aus einem Nest der Blattschneiderameise Atta sexdens (Acar.). [34] 122:5-70, ill., (*). **Stiles, K. A.**—The first record of the black widow spider (Latrodectus mactans texanus) from Iowa. [Proc. Iowa Acad. Sci.] 44:213.

THE SMALLER ORDERS OF INSECTS.—Banks, N.—Notes on native Myrmeleonidae (Neuropt.). [7] 31:413-421, ill., (k*). **Bragg, A. N.**—An early swarming of termites. [Proc. Okla. Acad. Sci.] 18:17. **Eastham, L.**—Movements of the gills of Ephemerid nymphs in relation to the water cur-

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HEMIPTERA.—Allard, H. A.—Notes on some Cicadas in Virginia and West Virginia. [6] 46:449-452. **Beamer & Lawson.**—The gen. Acinopterus (Cicadell.). [7] 31:476-488, ill., (k*). **Caldwell, J. S.**—Three n. spp. of Psyllids and the description of the allotype of Livia opaqua. [7] 31:442-444, ill. **Decker & Andre.**—Biological notes on Blissus iowensis (Lygaeid.). [7] 31:457-466, ill. **Dias & Torrealba.**—Infeccao naturae do Eutriatoma maculata pelo Schizotrypanum cruzi, no Brazil e na Venezuela. [111] 33:249-252, ill. **Hungerford, H. B.**—Mesoveloidea williamsi—a note on its distribution. [19] 33:218. **Knull & Auten.**—Some Erythroneura from the southwest (Cicadell.). [7] 31:532-539, ill., (*). **Metcalf, Z. P.**—The Fulgorina of Barro Colorado and other parts of Panama. [Bull. M. C. Z. Harvard] 82:277-423, ill., (k*). **Ruckes, H.**—Two n. spp. of Brochymena (Pentatom.) from Arizona. [19] 33:236-242, ill. **Spooner, C. S.**—Berbid field days. [Trans. Ill. St. Acad. Sci.] 30:315-316. **Strom, L. G.**—N. spp. of Aphids with notes on described forms. [7] 31:471-475, ill.

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Special Notices.

Annual Report of the Institute for Medical Research for the Year 1937. By A. Neave Kingsbury, Director. Federated Malay States, Kuala Lumpur, v + 174 pp., 1938.—This Institute for Medical Research comprises Divisions of Bacteriology, Chemistry, Entomology, Filariasis Enquiry, Malaria Research, Pathology, Rat Virus Enquiry, and a Serological and Medico-Legal section. The work of at least four of these includes entomological topics. A general review of the work of the year is furnished by the Director preceding the more detailed reports from each division. It appears that filariasis, including at least 50,000 cases of elephantiasis, is more wide-spread than had been previously thought. Researches by Mr. E. P. Hodgkin indicate that five species of the mosquito genus *Mansonia* are actual or possible carriers of *Wuchereria bancrofti* and *Microfilaria malayi*. The number of species of anopheline mosquitoes acting as carriers of malaria continues to be increased. Much attention is being given to investigations of rural tropical typhus, considered to be caused by the same virus as Japanese River Fever, and to urban tropical typhus and the question of transmission of the latter by the rat flea, *Xenopsylla cheopis*.

Endemic Filariasis in the Federated Malay States. By J. Orde Poynton and E. P. Hodgkin. Bulletins from The Institute for Medical Research, Federated Malay States, Kuala Lumpur, No. 1, 1938. 67 pp., 1 colored plate illustrating typical elephantiasis due to *Microfilaria malayi*.—From the summary of conclusions we quote as follows: Two species of the *Filariidae* are responsible for filariasis in the Federated Malay States. *Wuchereria bancrofti* is found sporadically

distributed among immigrants from India and China, but is only rarely transmitted in this country. *Microfilaria malayi* is endemic in certain riverine areas, in which it is transmitted freely by certain mosquitoes of the genus Mansonia. Infestation with *Mf. malayi* may give rise to adenitis, periodic lymphangitis, and to elephantiasis in which the feet and legs are typically involved. The intensity of endemic filariasis on the lower reaches of the Pahang, Perak and Bernam rivers is sufficient to warrant action towards arresting the spread of this disease, being responsible for a considerable degree of incapacity among adult males. At the present time the disease is tending to increase in certain areas, and it is in these in particular that action is indicated as numbers of children are becoming involved. The methods of treatment at present available are not satisfactory, and there is scope for further experimentation in this direction. The control of the vector mosquitoes presents many difficulties, but is the logical method, combined with other means of interrupting transmission, by which to approach the elimination of the endemic filariasis that is caused by *Mf. malayi* in this country.

OBITUARY

GUILLAUME SEVERIN.

The compte rendu of the monthly meeting of the Entomological Society of Belgium of August 6, 1938, states: We have learned of the decease, on July 23 last, of M. Guillaume Severin, former member of the society and honorary conservator of the entomological section of the Royal Museum of Natural History of Belgium. M. Severin died suddenly of an embolism while he was determining some insects captured by him the day before. The *Faune* of M. Lameere was found open by his side. An obituary notice by M. Lameere will appear in this number.

We translate this notice as follows: GUILLAUME SEVERIN (1862-1938) by A. LAMEERE. Our former colleague died unexpectedly, the 23d of July last, aged 76 years, at Saint Idesbald. Although even before his retirement as conservator from the Museum of Natural History on reaching the age limit, he had withdrawn from our society, the services which he rendered to entomology in our country are too important that we should forbear to pay him an affectionate tribute.

G. Severin, born at The Hague, was a decorative industrial designer at Liége when his health, momentarily weakened, brought him to the attention of Dr. Ernest Candèze. Our illustrious colleague advised him to go out as much as possible in the open air, and, that he might have some objective for his walks in the country, to interest himself in insects. Thus it was that G. Severin became an entomologist and began to occupy himself with the Coleoptera. In 1889 he published in our *Annales* a *Catalogue des Gyrinides*. On the recommendation of Dr. Candèze and of Edmund de Selys-Longchamps, who had come to appreciate his merits, he was named, on the resignation of Alfred Preudhomme de Borre, aid-naturalist to the Museum, then promoted to be conservator of the section of Articulata. He fulfilled these functions with a remarkable comprehension of his duties and with untiring devotion. Under his excellent administration, and thanks to his enlightened zeal, the collections made real progress and he contributed much to bring us new adepts in entomology. We owe to him the creation of ecological collections of native insects, in the formation of which he devoted years to the exploration of the country.

He interested himself actively in the organization of the International Congress of Entomology and was the secretary of the first congress, held at Brussels, in 1910. His relations with foreigners permitted him to determine to which of the different museums of Europe collections should be sent to be studied. It was he also who assumed the task of obtaining collaborators for the *Catalogue des Collections d'Edmond de Selys Longchamps* and overseeing the publication of this valuable summary.

G. Severin also devoted a portion of his activity to our School of Tropical Medicine, where he taught the doctors who were preparing to go to the Congo some ideas of entomology necessary for their mission.

From the moment when he was nominated to the Museum of Natural History, he consecrated himself entirely to his administrative functions and published only some papers on applied entomology as a member of the Superior Council of Waters and Forests.

Gifted with great intelligence, with highly developed practical sense, both artist and musician, of impulsive character, he had the affection of all entomologists. We shall preserve the fondest memories of him.

[This notice is accompanied by a portrait.] (Bull. & Ann. Soc. Ent. Belg. 78 (8-9), pp. 311-314, Sept. 26, 1938.)

We are indebted to Professor Lameere and to the Société Entomologique de Belgique, through its Secretary, M. A. Crèvecoeur, for permission to publish this translation.

The translator went to the Museum at Brussels on July 31, 1895, and "found M. Severin there to whom I delivered the letter of introduction from Baron de Selys and also one from Mr. Blandford of London. There also I met M. Lameere to whom M. Severin introduced me. M. Severin was very attentive and, as the Baron had requested in the letter, showed me the collection of insects, etc., and also the chief feature of this museum—the complete skeletons of the fossil reptiles known as Iguanodons found in Belgium. . . . "

Severin came to the United States on the occasion of the International Congress of Zoology held at Boston, in August, 1907, and subsequently visited museums in a number of cities, seeking support and subscriptions to the *Selys Catalogue*. Appeals which he later wrote for the same object were published in the NEWS for March, 1919 (volume xxx, pp. 84-85) and in *Science* (n. s. 49 (1263) :264-265, March, 14, 1919), in which he incidentally refers to the loss of his son in the great war, "a fine boy of 24 years, a captain of engineers." A later note on "The Cause of the Delay of Publication of the Selys Catalogue" by Severin appeared in the NEWS for October 1919 (xxx, pp. 229-230).

After his retirement from the Museum, in September, 1927, he lived for a while at La Panne, on the Belgian coast, not far from Calais. He came from there to Brussels in July, 1929, when we were at the Museum and gave us much assistance with de Sely's drawings and manuscripts in connection with a study of the Odonate *Palaemnema*. How great a help he was to the late E. B. Williamson is recorded in the latter's papers on American Gynacanthas and on *Heteragrion*.

His passing severs another link in the chain which bound us to the older students in Europe of the Odonata.

PHILIP P. CALVERT.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Wanted—Chrysalids of Papilio ajax and philenor, cocoons of Rothschildia orizaba and jorulla. Buy or exchange. Newark Entomological Society. Curator, Chas. Rummel, Green Village Rd., R. D. 2, Madison, New Jersey.

Have large list of Lepidoptera wants and offers. Send me yours. Carpenter, Box 1344, Hartford, Conn.

Geometers Wanted from all parts of United States and Canada, for cash or in exchange for butterflies. Noctuids or other Geometers. Edwin I. Guedet, P. O. Box 305, Napa, California.

Mr. Robert "Colegio de la Salle, Vedado, Habana, Cuba," offers Coleoptera, Lepidoptera, Land and Sea Shells, Bird Skins, Botanical Specimens, Cuban Cactus and cleaned "Diatom" Material.

Wanted for cash or exchange any pamphlets dealing with the American Hesperiidae. K. J. Hayward, Entomologist, Concordia Experiment Station, E. R. Argentine.

Wanted—*Megathymus streckeri* from S. W. Colo. or New Mex. Also from Texas. Also *M. yuccae* from Colo. Offer in exch. *Meg. leussleri* Holl. (Nebr. race *streckeri*). R. A. Leussler, 115 S. 52nd St., Omaha, Nebr.

Wanted—Cantharidae of the United States, esp. those of the genus Cantharis. Will exchange named beetles of Oregon. K. M. Fender, 930 S. Davis St., McMinnville, Oregon.

Desired—Ichneumonidae. Especially Tryphoninae of the world for revisionary work. Will exchange or purchase acceptable material. Andrew R. Park, Jr., c/o State Dept. of Public Health, 1800 Fillmore Street, Chicago, Illinois.

Lucanidæ of the world. Will determine, exchange or purchase. Desire especially neotropical material for revisional work. Bernard Benesh, Box 159, North Chicago, Ill.

60 Cocoons, carefully fed, of **Samia nokomis** for Comstock's California Butterflies and 40 for Holland's Butterflies, Vol. 2. Both either new or second, or will exchange **nokomis** cocoons for desirable butterflies, **Papilio, Argynnis** or **Megathymus.** Jack Dennis, Beulah, Manitoba, Canada.

Desired—Dolichopodidae of western United States and Canada. Will determine for privilege of retaining duplicates. F. C. Harmston, Entomology Dept., Utah Agric. College, Logan, Utah.

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